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ABSTRACT

Ninety-nine Pennsylvania teachers of agriculture and a corresponding number of guidance counselors were involved over a period of 3 years in an in-service teacher education program to determine effective methods of utilizing occupational information in agriculture. Objectives were: (1) to organize and develop occupational information in agriculture for guidance counselors and teachers to use in acquainting students with occupations in the agricultural world of work, and (2) to test experimentally different methods of preparing and making available this information. Findings on Phase One of the study revealed positive relationships of agricultural interest, father's occupation, and student I.Q. with student-expressed intentions to elect agriculture in the next school year, to obtain post-high school education, and to enter an agricultural occupation. Findings of Phases Two and Three revealed that students living on farms had higher scores on the "Vocational Agriculture Interest Inventory." The test instrument and a listing of cooperating schools are appended. (GE)

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F I N A L R E P O R T

DEVELOPMENT AND EVALUATION OF OCCUPATIONAL INFORMATION IN AGRICULTURE

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1969

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PREFACE

How can I more effectively use occupational guidance information in agriculture? This is a question being asked by teachers of agriculture in secondary schools as they expand their programs to include education for all occupations requiring knowledge and skills in agricultural subjects.

This study was conducted to determine effective methods of utilizing guidance information by guidance counselors and teachers. Occupational information materials on agricultural occupations was organized and developed to acquaint counselors and agriculture teachers with the agricultural world of work. An advisory committee assisted in preparing the resource unit used in the project. The advisory committee, which included persons representing industry, education, and government follows:

Name	Title	Organization Represented
James C. Fink	State Supervisor Agricultural Education	Pennsylvania Department of Education
T. Dean Witmer	Consultant, Vocational Post-Secondary & Adult Ed.	Pennsylvania Department of Education
Miss Madelyn Kilmoyer	Personnel Manager	Agway, Inc.
Harry M. Kraft	Principal	Mt. Joy Area Vocational-Technical School
Howard L. Hendricks	Superintendent	Governor Mifflin Area Schools
Mrs. Virginia Kunkle	Guidance Counselor	Dover Area High School
Joseph T. Impellitteri	Associate Professor of Vocational Education	College of Education
James W. Kelz	Assistant Professor of Education	College of Education
P. Glenn Harr	Instructor in Agricultural Extension	College of Agriculture

ABSTRACT

In recent years employment opportunities have increased in off-farm agriculture. The Vocational Education Act of 1963 recognized this by providing for vocational education in any occupation involving knowledge and skills in agricultural subjects. Agricultural occupations are classified as (1) agricultural production, (2) agricultural supplies, (3) agricultural mechanics, (4) agricultural products, (5) ornamental horticulture, (6) agricultural resources, (7) forestry, and (8) other agriculture.

Vocational and technical education for off-farm agricultural occupations is now being offered. Occupational information is being developed; therefore, ways of utilizing this information effectively with students must be determined.

Ninety-nine Pennsylvania teachers of agriculture and a corresponding number of guidance counselors were involved over a period of three years in an in-service teacher education program to determine effective methods of utilizing occupational information in agriculture.

Specific objectives of the study were:

1. To organize and develop occupational information in agriculture for guidance counselors and teachers to use in acquainting students with occupations in the agricultural world of work.

2. To test experimentally different methods of preparing and making available agricultural occupations information to guidance counselors and agriculture teachers.

In Phase One of the project, six experimental treatments were used to determine effective methods of utilization of guidance information and agricultural occupations information by counselors and teachers. They were: (1) teachers and counselors received prepared resource materials titled, Planning for a Career in Agriculture, were asked to teach a unit on occupational guidance in agriculture, but did not receive any in-service education; (2) teachers and counselors received the resource materials, were asked to teach the unit, and attended five two-and-one half hour in-service class sessions; (3) teachers and counselors received the resource materials, were asked to teach the unit, and received two two-hour in-service education visits in their individual schools; (4) teachers and counselors received the resource materials, were not specifically asked to teach the unit, and did not receive any in-service education; (5) teachers and counselors received the resource materials, were not specifically asked to teach the unit, but attended the five in-service education classes; and (6) teachers and counselors did not receive the resource materials, were not asked to teach the unit, and did not receive any in-service education.

Eight schools were randomly assigned to each treatment group. Forty-eight teachers, 48 counselors, and 709 ninth and tenth grade students were involved. Students were administered the Vocational Agriculture Interest Inventory and teachers asked to teach the unit were requested to use eighteen hours of class time. Following the instruction, students again completed the interest inventory, took a test of knowledge of guidance and agricultural occupations information and an attitude test.

Pretest agriculture interest score and I.Q. were selected as covariates for the analysis of covariance to test for differences among adjusted school and student mean test scores. Significant canonical correlations were determined among ten semantic differential attitude concepts and four other criterion measures.

In Phase Two of the project, purposes were to assist guidance counselors and teachers of agriculture to measure student interest and aspirations and to determine relationships among these and other student characteristics and a two-part achievement test. In thirty high schools in northeastern Pennsylvania 390 students in ninth and tenth grade agriculture classes were taught the unit in sixteen to twenty hours of class time. An in-service teacher education conference was held in advance with the teachers of agriculture and a guidance counselor in each school. The instructional materials were furnished. Testing and other data collection activities were carried out by the project leader as each school completed the unit.

In Phase Three of the project, 1968-69, emphasis was on in-service teacher education with 21 first and second year teachers involving 364 ninth and tenth grade agriculture students. Procedures were similar to those used in the second phase of the project.

For Phase One of the study findings were as follows: On knowledge of guidance information, scores for groups 1 and 3 were higher than for groups 2, 4, 5, and 6. There were no differences among treatments on knowledge of agricultural occupations information. The agricultural interest scores for groups 4 and 5 were higher than for group 2. On six of ten stimulus concepts treatment group 3 had the highest semantic differential attitude score.

There were positive relationships of agricultural interest, father's occupation, and student I.Q. with student expressed intentions to elect agriculture in the next school year, to obtain post-high school education, and to enter an agricultural occupation. The first significant canonical correlation was for student attitude toward an agricultural production occupation and an agricultural profession with score on the Vocational Agriculture Interest Inventory; a second was for student attitude toward the guidance counselor and the value of self analysis correlated with the guidance information test score.

Findings for Phase Two of the study were: Students living on farms had higher scores on the Vocational Agriculture Interest Inventory. Those with full-time farm experience had the highest scores. There were higher mean scores for the students planning to enter an agricultural occupation, those planning post-high school education, and those planning to continue in the agriculture curriculum.

Student scores on the total test of guidance and agricultural occupations information were higher for students living on farms and for students with full-time farm experience. Mean scores on the total test were higher for students planning to enter an agricultural occupation, planning post-high school education, and planning to continue in the agriculture curriculum.

Results for Phase Three of the project were similar to those of Phase Two. Student scores on the 40 item test were about the same. First and second year teachers, with the assistance given by a Penn State resource person in a two-hour conference, a student resource booklet, a teacher's guide, and supplemental teaching materials suggested by the resource person, were able to effectively teach the unit and establish satisfactory rapport with guidance counselors.

METHOD

Phase One 1966-67

The purpose of the first phase of this project was to determine effective methods of utilization of occupational information in agriculture by guidance counselors and teachers. A secondary purpose was to prepare and make available to counselors and teachers occupations information that could be used to acquaint agriculture students with the employment opportunities in the agricultural world of work. Six experimental methods of making agricultural occupations information available to students were compared. The following hypotheses were tested:

I. There are significant differences among six methods of utilization of occupational information in agriculture by guidance counselors and teachers as measured by students scores on the following:

   A. a multiple choice test of guidance and agricultural occupations information

   B. a multiple choice test of guidance information alone

   C. a multiple choice test of agricultural occupations information alone

   D. the Vocational Agriculture Interest Inventory

   E. a semantic differential attitude test

II. There are significant associations of expressed intentions of students, following experimental treatments, to enter an agricultural occupation, to obtain post-high school education, and to elect agriculture for the next school year with each of the following:

   A. six experimental treatments

   B. father's occupation

   C. agricultural interest

   D. I.Q.

III. There are significant canonical correlations among ten items on the semantic differential attitude test and the four other criterion measures.

The study was designed as a controlled teaching experiment in order that comparisons could be made among six methods of utilization of occupational information in agriculture by guidance counselors and teachers. Experimental methods tested were:

1. Teachers and counselors received the resource materials, were asked to teach the unit on occupational guidance in agriculture, but did not receive any in-service education.

2. Teachers and counselors received the resource materials, were asked to teach the unit on occupational guidance in agriculture, and attended five in-service education classes.

3. Teachers and counselors received the resource materials, were asked to teach the unit on occupational guidance in agriculture, and received two in-service education visits in their individual schools.

4. Teachers and counselors received the resource materials, were not specifically asked to teach the unit on occupational guidance in agriculture, and did not receive any in-service education.

5. Teachers and counselors received the resource materials, were not specifically asked to teach the unit on occupational guidance in agriculture, but attended five in-service education classes.

6. Teachers and counselors did not receive the resource materials, were not asked to teach the unit on occupational guidance in agriculture, and did not receive any in-service education.

The number of schools and students who were involved in the study by treatment groups were:

Treatment Group	No. of Schools	No. of Students
1	8	102
2	8	126
3	8	119
4	8	150
5	8	104
6	8	108
6	48	709

A student resource unit, Planning for a Career in Agriculture, was developed to serve as a source of guidance and agricultural occupations information for ninth and tenth grade agriculture students. A teacher's guide was also prepared to provide teachers with suggested teaching-learning activities for the student resource unit.

Teachers and counselors in Treatments 2 and 5 attended five two and one-half hour in-service education classes in the fall term of 1966. The participants received one graduate credit for Agricultural Education 424v, Occupational Guidance in Agriculture. The purposes of the classes were to acquaint teachers and counselors with the total agricultural education program, the employment opportunities in the agricultural world of work, and suggested procedures for teaching agricultural occupations information in group guidance classes.

Teachers and counselors in Treatment 3 received four hours of in-service education in their respective schools. The investigator made two in-service education visits to each of the eight schools in the treatment group and met with the counselor and teacher of agriculture for approximately two hours on each occasion. The purposes of these in-service education visits were the same as for the five two and one-half hour in-service education classes that were attended by the teachers and counselors in Treatments 2 and 5.

Schools that were represented by a counselor and teacher who completed Agricultural Education 424v in 5 two and one-half hour in-service education classes served as the first population. From this group, 16 schools were assigned to Treatments 2 and 5. A second population of schools from central and southeastern Pennsylvania was selected on the basis that Agricultural Education 424v had not previously been offered in this section of the state. From this group of schools, 32 schools were randomly assigned to the remaining four treatment groups.

On the day that the instructional materials were delivered to the schools, students were tested with the Vocational Agriculture Interest Inventory and teachers and counselors were given appropriate instructions for their respective treatment groups. Those teachers who were asked to teach the unit were requested to spend 18 clock hours of class time on the unit in order to serve as a control on teaching time. Following the instruction, students were administered the Vocational Agriculture Interest Inventory, test of knowledge of guidance and agricultural occupations information, and the attitude test based on the semantic differential.

The pretest and test answer sheets for the Vocational Agriculture Interest Inventory and the answer sheets for the two part test of knowledge of guidance information and agricultural occupations information were machine scored by the Educational Testing Service, The Pennsylvania State University. The attitude test based on the semantic differential was hand scored. All test scores and other pertinent student data were punched on IBM cards for data processing.

I.Q. and pretest agriculture interest scores were selected as covariates for the single classification analysis of covariance design used to test for differences among adjusted school mean and adjusted student mean test scores for (1) knowledge of guidance and agricultural occupations information, and (2) agricultural interest. Duncan's multiple range test was used to determine which treatments differed at the .01 and .05 levels of significance. Single classification analysis of variance was used to test for differences in student attitude toward ten selected stimulus concepts. Significance of association of student expressed intentions with father's occupation, agricultural interest, and I.Q. were tested by chi-square.

Canonical correlation was used to determine significant correlations among ten items on the semantic differential attitude test and the four other criterion measures.

In summary, the procedure used and work completed for Phase One follows:

1. Visited approximately 25 schools and talked with guidance counselors and agriculture teachers to determine their interest in participating in the project.

2. Developed a 151-page student resource unit and a 20-page teacher's guide on occupational information in agriculture (See Appendix A and B).

3. Made arrangements for and conducted two in-service education courses, five sessions each, for agriculture teachers and guidance counselors in Berks and Lebanon Counties and York and Lancaster Counties. Thirty-three teachers of agriculture, and 26 guidance counselors attended the two courses held during October and November, 1966. The agriculture teachers and guidance counselors in the in-service education classes evaluated the student resource unit and teacher's guide and made suggestions for their revision.

4. Selected a sample of 48 schools in central and southeastern Pennsylvania for the teaching experiment which included over 700 ninth and tenth grade agricultural students.

5. Visited each of the 48 schools involved in the teaching experiment; tested their 9th and/or 10th grade agriculture students with the Vocational Agriculture Interest Inventory; gave special directions to teachers and counselors according to the treatment group; and left the necessary supply of teaching materials.

6. Visited eight of the schools two additional times for special in-service education meetings with the agriculture teacher and guidance counselors as indicated for treatment C.

7. Developed two criterion tests:

   a. Multiple choice test consisting of 40 test items on occupational information in agriculture.

   b. Attitude test to measure student attitude toward certain guidance and agricultural concepts using the semantic differential technique.

8. Visited each of the 48 schools and administered three tests to the same 9th and/or 10th grade agriculture students who were previously tested. The tests were:

   a. The Vocational Agriculture Interest Inventory.

   b. A multiple choice test on occupational information in agriculture.

   c. A semantic differential attitude test of concepts.

9. Had each teacher who was asked to teach the unit complete a resource unit evaluation form.

10. Tabulated all test information by student and school.

11. Had a meeting of the advisory committee.

12. Mailed individual student test data to each teacher.

Phase Two 1967-68

The second phase of the project involved 390 students in 30 northeastern Pennsylvania schools. Each school was contacted and a conference scheduled with agriculture teachers and guidance counselors.

During the conference the resource unit, Planning for a Career in Agriculture, was discussed. Each cooperating teacher was given a packet of background information, a teacher's guide and sufficient student resource booklets so that he could teach the unit to his freshman and/or sophomore agriculture classes. The recommended teaching time for the unit was 16-20 clock hours of instruction. A tentative testing date was established.

To get accurate test scores, all students were tested as soon as possible after completing the unit of instruction. A written test on the unit of instruction and the Vocational Agriculture Interest Inventory were administered to the students. The students also completed a student information sheet. The tests were scored by the Educational Testing Service, The Pennsylvania State University. Copies of student performance for students of each school were mailed to the guidance counselor and agriculture teacher of that school.

The study was primarily concerned with relationships of student classifications to agricultural interest, I.Q. and scores on an achievement test. Only those students whose I.Q. was 80 or above were treated in the analysis of data and any student whose student information sheet was imcomplete was not included in the study.

The hypotheses tested in the second phase of the project were stated as null hypotheses. While there was reason to believe there were significant relationships, the null hypotheses were used to facilitate the application of statistical treatments. The major hypotheses were:

1. There are no significant differences among student mean scores on the Vocational Agriculture Interest Inventory after studying the unit of instruction, Planning for a Career in Agriculture when the students are classified according to:

   a. place of residence

   b. amount of farm experience

   c. plans for entering an agricultural occupation

   d. plans for post-high school education

   e. plans to continue in the agricultural curriculum

   f. I.Q.

2. There are no significant differences among student mean scores on an achievement test after studying the unit of instruction, Planning for a Career in Agriculture when the students are classified according to:

   a. place of residence

   b. amount of farm experience

   c. plans for entering an agricultural occupation

   d. plans for post-high school education

   e. plans to continue in the agricultural curriculum

   f. I.Q.

In summary, the procedure used and work completed for Phase Two follows:

1. Revised the student resource booklet, Planning for a Career in Agriculture. The "Teacher's Guide" also was revised. These revisions were based upon feedback from the 48 schools that participated in the 1966-67 Project and suggestions by the Advisory Committee.

2. Made arrangements for and conducted three two-hour dinner meetings for agriculture teachers and guidance counselors in the northeastern and northern tier counties in Pennsylvania. The project was explained and teachers and counselors were asked if they desired to participate in the project.

3. Determined thirty schools that desired to participate in the project. The schools had 390 ninth and tenth grade agriculture students.

4. Visited each of the thirty schools involved in the project; met with the counselor and agriculture teacher to explain the project in more depth and provide the necessary teaching materials; gave instructions to teachers and counselors concerning the unit of instruction.

5. Upon completion of the unit of instruction, each school was visited for a testing phase in which two tests were administered to the ninth and/or tenth grade agriculture students.

   a. The Vocational Agriculture Interest Inventory.

   b. A multiple choice test on occupational information in agriculture.

6. Had each teacher evaluate the student resource booklet, the teacher's guide and general conduct of the project.

7. Tabulated all test information by student and school.

8. Mailed individual student's test results to each teacher and guidance counselor involved.

9. Summarized and analyzed test results to determine various student classification relationships to I.Q., agriculture interest and performance on the written evaluation of Planning for a Career in Agriculture.

Phase Three 1968-69

The purpose of Phase Three of the project was to determine the effectiveness of the unit, other resource materials, and procedures when taught by first and second year teachers of agriculture. This was done through an in-service teacher education program with 21 schools and 364 ninth and tenth grade agricultural students. The method was similar to that used in Phase Two.

A summary of procedures used and work completed for Phase Three follows:

1. Revised the Teacher's Guide for the student resource booklet, Planning for a Career in Agriculture. The revisions consisted of updating some information and revising the film list.

2. Made arrangements to conduct the project in 21 high schools throughout Pennsylvania. The teachers of agriculture were all in their first or second year of teaching.

3. Collected occupational information and assembled packets to distribute to the teacher of agriculture and guidance counselor of each participating school.

4. Visited with teachers of agriculture and guidance counselors in each of 21 high schools in Pennsylvania. During a two-hour conference, planned in advance, discussed the student resource booklet and the teacher's guide for the unit Planning for a Career in Agriculture. Sufficient copies of the student resource booklet for teaching freshmen and/or sophomores were given to the teacher of agriculture.

   The conference included discussion of: occupational materials which were given to teachers and guidance counselors, the Vocational Agriculture Interest Inventory, and procedures to be used in teaching the unit.

5. The interest inventory was given to the students before teaching the occupation guidance unit. The test was given after teaching the occupation guidance unit.

6. Tabulated all test information by student and school.

7. Corresponded with each teacher of agriculture for an evaluation of unit.

8. Mailed individual student test results and Vocational Agriculture Interest Inventory results to each teacher and guidance counselor involved in the study.

RESULTS AND FINDINGS

Analysis of data and findings of the project, in detail, are presented in this section of the report.

Phase One 1966-67

Data used to test Hypothesis I are presented in the first five tables. In each table a different criterion measure was employed. The tests for significant differences were made among the six experimental teaching treatment methods, as described under "method."

Comparisons among the six experimental methods were made by the use of analysis of covariance, analysis of variance, and the Duncan multiple range test. I.Q. and agricultural interest were selected as covariates to serve as controls on individual student differences in the covariance. Statistical comparisons among the treatments were made for both the (1) adjusted school mean test scores and (2) adjusted student mean test scores.

Relationship of each of four characteristics to three student expressed intentions was tested by chi-square in Tables 6 to 9. The characteristics were treatments, agricultural interest, father's occupation, and student I.Q. The student expressed intentions were to elect agriculture the next school year, to obtain post-high school education, and to enter an agricultural occupation.

In Table 10, significant canonical correlations were computed between ten semantic differential attitude scores and four other criterion measures.

Knowledge of Guidance and Agricultural Occupations Information

The test of Hypothesis I-A showed that there were significant differences among six methods of utilization of agricultural occupations information in agriculture by guidance counselors and teachers as measured by student scores on a multiple choice test of guidance and agricultural occupations information. The data in Table 1 revealed that the adjusted school and student mean test scores differed significantly by analysis of covariance. The adjusted school mean test scores differed at the .10 level and the adjusted student mean test scores differed at the .01 level.

When the Duncan multiple range test was applied to the adjusted student mean test scores, Treatments 1 and 3 were significantly higher

Table 1. Adjusted School and Student Mean Test Scores for Knowledge of Guidance Information and Agricultural Occupations Information by Six Treatments

Treatment	Number	Mean I.Q.	Mean Pretest Ag. Interest Score	Adjusted Mean Test Score
		School Scores		
1	8	96.3	66.9	20.4
2	8	100.1	69.3	19.3
3	8	96.9	68.1	20.7
4	8	99.6	67.5	18.0
5	8	99.9	67.4	17.8
6	8	98.5	62.9	18.0
		Student Scores**		
1	102	96.2	66.3	20.3
2	126	100.3	68.2	19.1
3	119	96.8	68.7	20.3
4	150	99.4	66.7	18.0
5	104	99.7	66.8	17.7
6	108	99.1	61.3	18.0

Adjusted school mean test scores differed among treatments at the .10 level by analysis of covariance.

**Adjusted student mean test scores differed among treatments at the .10 level by analysis of covariance.

Treatments 1 and 3 were higher than 4, 5, and 6.

than 4, 5, and 6. The scores ranged from 20.3 for Treatments 1 and 3 to 17.7 for Treatment 5.

Although students in Treatment 2 were taught the unit by teachers who had attended the inservice education classes, student scores did not indicate that the inservice education had any appreciable influence on increasing student knowledge of guidance and agricultural occupations information.

It is possible that teachers in Treatment 1 worked harder at the job of teaching the unit since they did not receive any inservice education. However, there was no knowledge to indicate that this was true. Students in Treatment 3 did equally as well on the test of guidance and agricultural occupations information as did students in Treatment 1. The most important factor appeared to be that when students are taught, they make higher scores than students not taught in formal classes.

Knowledge of Guidance Information

The test of Hypothesis I-B showed that there were significant differences among six methods of utilization of agricultural occupations information by guidance counselors and teachers as measured by student scores on a multiple choice test of guidance information alone. The adjusted school mean test scores differed at the .05 level by analysis of covariance. Scores for Treatments 1 and 3 were higher than 4, 5, and 6. The adjusted student mean test scores differed at the .01 level by analysis of covariance. Scores for Treatment 1 and 3 were significantly higher than Treatments 2, 4, 5, and 6. These data are summarized in Table 2.

The adjusted student mean test scores ranged from 10.8 for Treatment 3 to 8.8 for Treatment 5. Again the inservice education received by teachers and counselors in Treatment 2 did not appear to affect student learning. The involvement of the guidance counselor in the instruction that was provided for Treatments 1 and 3 may have had an influence on student scores.

Knowledge of Agricultural Occupations Information

The test of Hypothesis I-C showed that there were no significant differences among six methods of utilization of occupational information in agriculture by guidance counselors and teachers as measured by student scores on a multiple choice test of agricultural occupations information alone. No significant differences were found among the treatments, as shown in Table 3, for either the adjusted school or student mean test scores by analysis of covariance.

Table 2. Adjusted School and Student Mean Test Scores for Knowledge of Guidance Information by Six Treatments.

Treatment	Number	Mean I.Q.	Mean Pretest Ag. Interest Score	Adjusted Mean Test Score
		School Scores *		
1	8	96.3	66.9	10.7
2	8	100.1	69.3	9.9
3	8	96.9	68.1	11.0
4	8	99.6	67.5	9.2
5	8	99.9	67.4	8.9
6	8	98.5	62.9	9.2
		Student Scores**		
1	102	96.2	66.3	10.7
2	126	100.3	68.2	9.8
3	119	96.8	68.7	10.8
4	150	99.4	66.7	9.3
5	104	99.7	66.8	8.8
6	108	99.1	61.3	9.2

*Adjusted school mean test scores differed among treatments at the .05 level by analysis of covariance. Treatments 1 and 3 were higher than 4, 5, and 6.

**Adjusted student mean test scores differed among treatments at the .01 level by analysis of covariance. Treatments 1 and 3 were higher than 2, 4, 5, and 6.

Table 3. Adjusted school and Student Mean Test Scores for Knowledge of Agricultural Occupations Information by Six Treatments.

Treatment	Number	Mean I.Q.	Mean Pretest Ag. Interest Score	Adjusted Mean Test Score
		School Scores		
1	8	96.3	66.9	9.5
2	8	100.1	69.3	9.4
3	8	96.9	68.1	9.7
4	8	99.6	67.5	8.8
5	8	99.9	67.4	8.9
6	8	98.5	62.9	8.8
		Student Scores		
1	102	96.2	66.3	9.4
2	126	100.3	68.2	9.4
3	119	96.8	68.7	9.6
4	150	99.4	66.7	8.7
5	104	99.7	66.8	8.9
6	108	99.1	61.3	8.7

No significant differences among treatments by analysis of covariance.

The adjusted school mean test scores ranged from 9.7 for Treatment 3 to 8.8 for Treatments 4 and 6. The adjusted student mean test scores ranged from 9.6 for Treatment 3 to 8.7 for Treatments 4 and 6. Although student scores were higher for students who were taught the unit, they were not significantly higher than those not taught the unit in formal classes.

It appears that teachers of agriculture have emphasized agricultural occupations in their instructional programs by incorporating these kinds of information into instructional unit that they teach. However, it should be noted that the same does not appear to be true for knowledge of general guidance information since significant differences were found among the treatments when analyzed by analysis of covariance.

Agricultural Interest

The test of Hypothesis I-D showed that there were significant differences among five methods of utilization of occupational information in agriculture by guidance counselors and teachers as measured by student scores on the Vocational Agriculture Interest Inventory. This analysis was computed from five sets of pretest and test agricultural interest scores since Treatment 6, the no special treatment group, was administered the Vocational Agriculture Interest Inventory on only one occasion. Significant differences were found among the treatments for the adjusted student mean test scores at the .05 level by analysis of covariance. As described in Table 4, Treatments 4 and 5 were significantly higher than 2 when Duncan's multiple range test was applied to the adjusted student mean test scores. No differences were found among the treatments for the adjusted school mean test scores.

In each case pretest agricultural interest scores for all treatments were 66.0 or higher which indicates a high level of interest in agriculture. It should be noted that Treatment 2 had the second highest pretest interest score, but had the lowest adjusted mean interest score. It is possible that the decrease from pretest to test was due to the interest test itself, since it is designed primarily to measure a student's interest in agricultural production and the instruction received by students in Treatment 2 may have been directed toward off-farm agricultural occupations. It should also be noted that, like Treatment 2, agricultural interest scores for Treatments 1 and 3 went down from pretest to test. It appears that this could be possible due to the nature of the instruction received by the students and the design of the Vocational Agriculture Interest Inventory.

Table 4. Adjusted School and Student Mean Test Scores on the Vocational Agriculture Interest Inventory by Five Treatments.

Treatment	Number	Mean Pretest Ag. Interest Score	Adjusted Mean Ag. Interest Score
	School Scores		
1	8	66.9	65.7
2	8	69.3	65.7
3	8	68.1	67.3
4	8	67.5	68.6
5	8	67.4	69.5
	Student Scores*		
1	102	66.3	66.0
2	126	68.2	64.5
3	119	68.7	66.7
4	150	66.7	67.7
5	104	66.8	69.3

*Adjusted student mean interest scores differed among treatments at the .05 level by analysis of covariance. Treatments 4 and 5 were higher than 2.

Student Attitudes Toward Ten Stimulus Concepts

The test of Hypothesis I-E showed that there were significant differences among six methods of utilization of occupational information in agriculture by guidance counselors and teachers as measured by a semantic differential attitude test. These data are reported in Table 5. Significant differences were found among the treatments at the .01 and .05 level for the student mean attitude scores for six of the ten stimulus concepts when analyzed by analysis of variance. In six instances, Treatment 3 had more favorable effects on student attitude toward the ten stimulus concepts than did the other treatments. No significant differences were found among the treatments for any of the ten stimulus concepts for the school mean attitude scores as shown in Appendix I.

Students in Treatment 3 had a more favorable attitude toward their Guidance Counselor than students in 2, 4, 5, and 6 at the .01 level by analysis of variance and Duncan's multiple range test. Treatment 1 was also higher than 5 and 6 at the .05 level. In Treatment 3, the teacher and guidance counselor were asked to teach the instructional unit. By involving the counselor in the instruction of the unit, student attitudes toward their guidance counselor were higher than when the guidance counselor was not involved. It is possible that the teachers in Treatment 1 followed the suggestions in the teacher's guide and involved their counselor in some phase of the instruction.

Students in Treatment 3 had a more favorable attitude toward their Agriculture Teacher than 1, 2, and 6 at the .05 level of significance and Treatments 4 and 5 were higher than 2 at the .05 level. The treatments did not appear to have any explainable influence on student attitude toward their agriculture teacher.

Students in Treatment 3 had a more favorable attitude toward Occupational Information than 1, 2, and 5 at the .05 level. The adjusted student mean attitude scores ranged from 6.2 to 5.9 for the six treatments. It should be noted that all of the adjusted student mean test scores were relatively high for all six treatments.

Students in Treatment 3 had a more favorable attitude toward a Non-professional Off-farm Agricultural Occupation than 2, 4, and 5 at the .01 level of significance. The adjusted student mean attitude scores ranged from 5.4 to 4.9 for the six treatments. These scores were relatively low in comparison to the scores received by eight of the ten stimulus concepts. This indicates that at this point in their vocational development many ninth and tenth grade agriculture students are unaware of the employment opportunities in off-farm agricultural occupations.

Table 5. Student Mean Scores for Attitudes Toward Ten Selected Stimulus Concepts as Measured by the Semantic Differential for Six Treatments.

Treatment	No. of Students	Mean Scores for Ten Attitudes (Stimulus Concepts)									
		1	2	3	4	5	6	7	8	9	10
1	102	5.9*	6.0	5.9	5.6	5.0	5.8	6.3	5.6	5.8	5.1
2	126	5.7	5.8	5.9	5.7	4.9	5.9	6.3	5.6	5.7	5.0
3	119	6.0**	6.3**	6.2**	5.8	5.4**	6.0*	6.5**	5.8	5.8	5.4
4	150	5.6	6.1*	6.0	5.6	4.8	6.0*	6.4	5.5	5.8	5.3
5	104	5.5	6.1	5.9	5.8	4.9	6.0*	6.4	5.5	5.7	5.3
6	108	5.4	6.0	6.0	5.8	5.1	5.6	6.5*	5.4	5.8	5.0

Student mean attitude scores differed among treatments at the .01 level (**) or the .05 level (*) by analysis of variance.

1. Guidance Counselor
   **Treatment 3 > 2, 4, 5, 6
   *Treatment 1 > 5, 6
2. Agriculture Teacher
   *Treatment 3 > 1, 2, 6
   *Treatment 3, 4, 5, > 2
3. Occupational Information
   *Treatment 3 > 1, 2, 5
4. Agricultural Production Occupation
5. Non-professional Off-farm Agricultural Occupation
   **Treatment 3 > 2, 4, 5
6. Agricultural Professions
   *Treatment 3, 4, 5 > 6
7. Pennsylvania's Agriculture
   *Treatment 3 > 1, 2
   *Treatment 6 > 1
8. Self-analysis or self-appraisal
9. My Confidence to Choose an Occupation
10. My Plans for Education Beyond High School

Students in Treatments 3, 4, and 5 had a more favorable attitude toward the Agricultural Professions than Treatment 6 at the .05 level of significance. The scores ranged from 6.0 for Treatments 3, 4, and 5 to 5.6 for Treatment 6. In general, all treatments produced a more favorable attitude toward the agricultural professions than toward non-professional off-farm agricultural occupations. Perhaps students at the ninth and tenth grade level are more familiar with the agricultural professions than with off-farm agricultural occupations.

Students in Treatment 3 had a more favorable attitude toward Pennsylvania's Agriculture than 1 and 2 at the .05 level. Treatment 6 was also higher than 1 at the same level of significance. The attitude scores ranged from 6.5 for Treatment 3 to 6.3 for Treatments 1 and 2. The scores for all six treatment groups were very high, indicating that teachers have done an adequate job of helping students to develop an appreciation for the value of Pennsylvania's agriculture.

No significant differences were found among the student mean test scores for the stimulus concepts (1) Agricultural Production Occupation, (2) Self-analysis or Self-appraisal, (3) Confidence to Choose an Occupation, and (4) Plans for Education Beyond High School.

The school mean attitude scores for Self-analysis or Self-appraisal ranged from 5.6 to 5.5 for the six treatments. These low scores indicate that students in general have not developed an appreciation for self-analysis or self-appraisal in planning for a career. This could be related to the fact that students expressed a more favorable attitude toward the agricultural professions than off-farm agricultural occupations and that students need more instruction and/or counseling in general guidance information.

Students in all treatments expressed a similar attitude toward their Confidence to Choose an Occupation. The attitude scores ranged from 5.8 to 5.7 for the six treatments. These relatively low scores may indicate that many of the students in the ninth and tenth grade are still in the exploratory stage of their vocational development and do not feel secure enough to make a specific occupational choice at this time.

Student attitude scores toward their Plans for Education Beyond High School were the lowest for all the stimulus concepts to which students expressed their attitude. The scores ranged from 5.3 for Treatment 3 to 5.0 for Treatment 6. It appears that many of these students at this time have not made definite plans for education beyond high school. It may also mean that perhaps there are many students who are enrolled in agriculture who have the capability to pursue additional education beyond high school, but have not developed an appreciation for post-high school education.

Student Expressed Intentions

The test of Hypothesis II-A showed that there were significant associations of treatments with the expressed intentions of students, following experimental treatments, to enter an agricultural occupation, to obtain post-high school education, and to elect agriculture the next school year. The associations were significant at the .01 level by chi-square. These data are shown in Table 6. Treatments 2 and 3 had the highest proportion of "Yes" responses for the intention to enter an agricultural occupation, Treatments 3 and 4 had the highest proportion of "Yes" responses for the intention to obtain post-high school education, and Treatment 4 had the highest proportion of "Yes" responses for the intention to elect agriculture for the next school year.

The test of Hypothesis II-B showed that there were significant associations of father's occupation with the expressed intentions of students, following experimental treatments, to enter an agricultural occupation and to elect agriculture the next school year. The relationships were significant at the .01 level by chi-square. No relationship was found to exist between father's occupation and the intention to obtain post-high school education as revealed in Table 7. A higher proportion of students whose fathers were either full-time or part-time farmers expressed an intention to enter an agricultural occupation and a higher proportion of students whose fathers were full-time farmers and off-farm agricultural employees expressed an intention to elect agriculture the next school year.

The test of Hypothesis II-C showed that there were significant associations of agricultural interest with expressed intentions of students, following experimental treatments, to enter an agricultural occupation and to elect agriculture the next school year. The associations were significant by chi-square at the .01 level. The data are found in Table 8. No relationship was found to exist between students' level of agricultural interest and their intention to obtain post-high school education. Students who had high agricultural interest expressed the highest proportion of "Yes" responses to enter an agricultural occupation and to elect agriculture the next school year.

The test of Hypothesis II-D showed that there were significant associations of I.Q. with expressed intentions of students following experimental treatments, to enter an agricultural occupation and to obtain post-high school education by I.Q. The relationships were significant at the .01 level by chi-square. These data are found in Table 9. No relationship was found to exist between the level of student I.Q. and their intention to elect agriculture the next school year. A higher proportion of students with high I.Q.

Table 6. Student Expressed Intentions Following Experimental Treatment to Enter an Agricultural Occupation, to Obtain Post-High School Education, and to Elect Agriculture the Next School year by Six Treatments.

Treatment	To Enter An** Ag. Occupation		To Obtain** Post-High School Education		To Elect Agri-** culture The Next School Year	
	Yes	No	Yes	No	Yes	No
1	73	29	26	76	88	14
2	106**	20	26	100	112	14
3	91	28	39**	80	96	23
4	105	45	57**	93	143**	7
5	85**	19	22	82	95	9
6	73	35	21	87	97	11

**Significant at the .01 level by chi-square. High proportions of "Yes" responses are marked in each column.

Table 7. Student Expressed Intentions Following Experimental Treatment to Enter An Agricultural Occupation, to Obtain Post-High School Education, and to Elect Agriculture the Next School Year by Father's Occupation.

Father's Occupation	To Enter An** Ag. Occupation		To Obtain Post-High School Education		To Elect** Agriculture The Next School Year	
	Yes	No	Yes	No	Yes	No
Full-time farmer	191**	30	58	163	207**	14
Part-time farmer	167**	44	56	155	187	24
Off-farm ag. occupation	19	10	9	20	28**	1
Non-farm occupation	156	92	68	180	209	39

**Significant at the .01 level by chi-square. High proportions of "Yes" responses are marked in each column.

Table 8. Student Expressed Intentions Following Experimental Treatment to Enter an Agricultural Occupation, to Obtain Post-High School Education, and to Elect Agriculture the Next School Year by Agricultural Interest.

Agricultural Interest	To Enter An** Ag. Occupation		To Obtain Post-High School Education		To Elect** Agriculture The Next School Year	
	Yes	No	Yes	No	Yes	No
High	335**	48	104	279	369**	14
Medium	171	77	61	187	194	54
Low	27	51	26	52	68	10

**Significant at the .01 level by chi-square. High proportions of "Yes" responses are marked in each column.

Table 9. Student Expressed Intentions Following Experimental Treatment to Enter an Agricultural Occupation, to Obtain Post-High School Education, and to Elect Agriculture the Next School Year by I. Q.

I. Q.	To Enter An** Ag. Occupation		To Obtain** Post-High School Education		To Elect Agriculture The Next School Year	
	Yes	No	Yes	No	Yes	No
High (120 and up)	21**	4	16**	9	23	2
Medium (90-119)	423	120	148	395	489	54
Low (89 or less)	89	52	27	114	122	19

**Significant at the .01 level by chi-square. High proportions of "Yes" responses are marked in each column.

(120 and up) expressed an intention to enter an agricultural occupation and to obtain post-high school education.

Significant Canonical Correlations

Soar (Co-op. Research Project 1170, USOE, 1962) defined canonical correlation as "a procedure for creating a composite of criterion measures, with weights assigned to each measure in each composite in such a way as to make the correlation between predictor and criterion composites a maximum." The computer program used in this procedure was designed to solve successively for significant canonical correlation coefficients. At the same time, two sets of weights associated with each pair of canonical variates were computed. The original variables were brought into the canonical correlation problem by means of left and right hand variable cards. Student attitude scores toward ten stimulus concepts were used as the left hand variables and student scores on the Vocational Agriculture Interest Inventory, test of guidance and agricultural occupations information alone were used as right hand variables.

The test of Hypothesis III showed that there were significant canonical correlations among ten items on the semantic differential attitude test and four other criterion measures. On the completion of the analysis, the first and second canonical correlation coefficients were significant at the .01 level by chi-square as shown in Table 10.

The first significant canonical correlation was between student attitude toward an agricultural production occupation and toward the agricultural professions and score on the Vocational Agriculture Interest Inventory. It would be expected that student attitude toward an agricultural production occupation and toward the agricultural professions and score on the Vocational Agriculture Interest Inventory would have a high relationship since the interest inventory was designed to determine student interest in agricultural production occupations.

A second significant canonical correlation showed that student attitude toward their guidance counselor and toward the value of self-analysis correlated with the guidance information test score. It would be expected that student attitude toward their guidance counselor and the value of self-analysis would correlate with the test of guidance information. These data are found in Table 10.

Table 10. Canonical Correlation of Ten Student Semantic Differential Attitude Scores with the Four Other Criterion Measures.

Variable Name	Left-hand Weights	Variable Name	Right-hand Weights
Agricultural Production Occupation	0.607*	Vocational Agriculture Interest Inventory	0.884*
Agricultural Professions	0.575*	Total Guidance and Agricultural Occupations Information Test Score	0.362
Self-appraisal	0.280	Agricultural Occupations Information Test Score	0.296
Confidence to Choose an Occupation	0.278	Guidance Information Test Score	0.021
Guidance Counselor	0.247		
Educational Plans for the future	0.233		
Agriculture Teacher	0.146		
Off-farm Agricultural Occupation	0.007		
Occupational Information	-0.089		
Pennsylvania's Agriculture	-0.017		

*First canonical correlation coefficient = 0.501

Chi-square =259 with 40 degrees of freedom, significant at .01 level.

(continued on next page)

Table 10. (Continued)

Variable Name	Left-hand Weights	Variable Name	Right-hand Weights
Guidance Counselor	0.652*	Guidance Information Test Score	0.841*
Self-appraisal	0.403*		
Pennsylvania's Agriculture	0.128	Agricultural Occupations Information Test Score	0.011
Confidence to Choose an Occupation	0.043	Total Guidance and Agricultural Occupations Information Test Score	0.006
Occupational Information	0.040		
Off-farm Agricultural Occupation	0.032	Vocational Agriculture Interest Inventory	-0.541
Agriculture Teacher	0.009		
Educational Plans for the Future	-0.032		
Agricultural Professions	-0.150		
Agricultural Production Occupation	-0.607		

*Second canonical correlation coefficient = 0.227

Chi-square = 56.4 with 27 degrees of freedom, significant at the .01 level.

Phase Two

In Phase Two of the project, the means and standard deviations for 11 student variables are presented in Table 11. The first variable, age, is expressed in months. The mean was 190.11 months or 15 years and 8 months. Student place of residence, variable 2, was classified into three groups. To adapt the classification to computer programing those students living on farms were assigned the value 1, rural non-farm students were assigned the value 2, and those students living in an urban area were assigned the value 3. The resulting mean was 1.77.

Amount of student farming experience was classified into three groups, full time, part time, and none. The groups were assigned the values 3, 2, and 1, respectively, to assist the application of statistical treatments. Student farming experience had a mean 2.34.

Data concerning student future plans were also collected during the study. Each student stated his future plans by a positive or negative response to three questions. The three questions were: "Do you plan to enter an agricultural occupation after being graduated from high school?", "Do you plan to go to college or to enroll in any post high school education?", and "Do you plan to continue in the vocational agriculture program?". Negative responses were assigned a value of 1 and positive responses a value 2 resulting in means of 1.66, 1.68, and 1.80, respectively.

Students' I.Q. scores were obtained from school guidance counselors. The mean I.Q. score for the 390 students was 100.04 with a standard deviation of 10.23 which approximates the normal I.Q. curve. Student agriculture interest was measured by the Vocational Agriculture Interest Inventory. The mean agriculture interest score of the students was 61.72.

Variables 9, 10, and 11 were measured by a 40 item, two-part, multiple choice test. Questions 1 to 20 of the test measure students' knowledge of guidance information, variable 9, and questions 21 to 40 measure agricultural occupational information, variable 10, hereafter referred to as agriculture information. The total student score for the achievement test was variable 11. The mean for guidance information was 10.78, for agricultural occupational information the mean was 10.01, and the mean for the 40 item test was 20.75.

Table 11. Means and Standard Deviations of Eleven Student Variables

Variable	Mean	S.D.
1. age in months	190.11	11.18
2. residence	1.70	.77
3. amount of farm experience	2.34	.64
4. plans to enter an agricultural occupation	1.66	.47
5. plans for post high school education	1.68	.47
6. plans to continue in the agricultural curriculum	1.80	.40
7. I.Q.	100.04	10.23
8. agricultural interest	61.72	20.56
9. guidance information	10.78	3.24
10. agricultural occupational information	10.01	2.99
11. guidance and agricultural occupational information	20.75	5.41

Intercorrelations of 11 student variables were determined and are presented in Table 12. Many of the correlations are discussed later in the text of the appropriate tables. Age was negatively correlated with all of the variables. Of most concern was I.Q. where r = -.36 was significant at the .01 level. Since most older students had a lower I.Q., their achievement on the written test was also lower. The correlations of age with each part of the written test, variables 9 and 10, and with the total test score, variable 11, were r = -.14, r = -.10, and r = -.14, respectively. The correlations of r = -.14 and r = -.14 were significant at the .01 level and the correlation r = -.102 was significant at the .05 level.

The correlation of age and agricultural interest was r = -.14 and was significant at the .01 level. There were two possible reasons for such a negative correlation. First, correlation of age and plans to enter an agricultural occupation was r = -.10 and was significant at the .05 level. Second, the Vocational Agriculture Interest Inventory, the testing device, was validated for eighth grade students. The older students in the study may have been too old to be accurately measured by this test.

Student residence and farm experience were highly correlated; r = .61 was significant at the .01 level. Students living on farms have more farm experience. The correlation of residence and plans to enter an agricultural occupation was r = .29, significant at the .01 level. Students living on farms had a higher agriculture interest and more of them planned to enter an agricultural occupation. These facts reinforce why the correlation of residence and plans to remain in the agricultural curriculum was r = .12, significant at the .05 level. Farm youth were planning to remain in the agricultural curriculum through high school and then enter an agricultural occupation.

Student residence and I.Q. were correlated r = .12 at the .05 level. This assists in reasoning why the farm youth scored significantly high on the total achievement test, variable 11. The correlation of residence with guidance and agriculture information was r = .16, significant at the .01 level. Thus, students living on farms were more intelligent and scored significantly higher on the achievement test.

The amount of farm experience correlated significantly with plans to continue in the agriculture curriculum, r = .26, and with plans to enter an agricultural occupation, r = .37. Thus, the students with more farm experience plan to remain in the agricultural curriculum through high school and then enter an agricultural career.

Table 12. Intercorrelations of Eleven Student Variables

Variable Number	1	2	3	4	5	6	7	8	9	10
2	-.12									
3		.61								
4	-.10	.29	.37							
5				.12						
6		.22	.26	.41						
7	-.36	.12			.20					
8	-.14	.33	.36	.51	.15	.33				
9	-.14	.15	.10	.15	.30	.17	.45			
10	-.10	.14		.12	.26		.36	.13	.51	
11	-.14	.16	.10	.15	.32	.11	.47	.12	.87	.86

Code:
1. age
2. residence
3. farm experience
4. agricultural occupation
5. post high school education
6. continue in agriculture curriculum
7. I.Q.
8. agricultural interest
9. guidance information
10. agricultural information
11. guidance and agricultural information

N = 390

$r_{.01} = .128$

$r_{.05} = .098$

There was a significant correlation at the .01 level between plans to enter an agriculture occupation and plans to continue in the agricultural curriculum. A correlation was also found between students planning to enter an agricultural occupation and plans for post high school education. This resulted in r =.11 and was significant at the .05 level.

Student I.Q. and agriculture interest did not correlate because a student can have a high I.Q. and have little or no interest in agriculture or he can have a low I.Q. and a high interest in agriculture. A significant correlation was found, however, between I.Q. and student achievement on each part of the written test. The r = .45 for I.Q. and guidance information and r = .36 for I.Q. and agriculture information were significant at the .01 level. The correlation between I.Q. and the total test, guidance and agriculture information, was r - .47. This was also significant at the .01 level.

Agriculture interest did not correlate with the guidance information part of the test; however, it correlated to the .01 level with agriculture information where r = .13. Since one part of the test did not correlate and the other part was significant at the .01 level, the total test correlated at the .05 level. The correlation of agriculture interest with guidance and agriculture information was r = .11. Students with high agriculture interests scored higher on the agriculture information part of the test.

A correlation between guidance information and agriculture information was r = .51. The correlations between each part of the test and the total were nearly equal. Guidance information correlated with guidance information and agriculture information by r = .87 and agriculture information correlated with guidance and agriculture information by r = .86. These three correlations were significant at the .01 level.

Table 13 presents mean scores and differences on five measures for students classified by their plans to enter an agricultural occupation. A total of 257 of the 390 students were planning to enter an agricultural occupation.

There were no significant differences between the I.Q. scores of those students planning to enter an agricultural occupation and those who were not. Since the term "agricultural occupation" includes all professional, technical, semi-skilled, and unskilled occupations, one would not expect a significant difference; however, if the study has further classified into the areas of professional, semi-skilled and unskilled levels significant differences might have been determined. As one might expect there were significant differences between the agricultural interest scores. Those students planning to enter an agricultural occupation scored 69 on the interest

Table 13. Mean Scores and Differences on Five Measures for Students Classified by Plans to Enter an Agricultural Occupation

Plan to Enter Agricultural Occupation	Number of Students	I.Q.	Agriculture Interest	Guidance Information	Agricultural Information	Guidance and Agricultural Information
Yes	257	103.32	69.15	11.11	10.26	21.33
No	133	100.71	47.00	10.11	9.52	19.62
Difference		2.61	22.15**	1.00**	.74*	1.71**

**Significant at .01 level by analysis of variance

*Significant at .05 level by analysis of variance

test whereas those who were not planning to enter an agricultural occupation scored 47. This significant difference supports the use of the Vocational Agriculture Interest Inventory as a test to determine students with high agricultural interest.

A correlation of guidance information scores and plans to enter an agricultural occupation was r = .15, which was significant at the .01 level. Those students who are planning to enter an agricultural occupation score higher on the part of the test that measures student knowledge of guidance information. The students who answered yes to the question are more knowledgeable of guidance information and practices. The correlations of plans to enter an agricultural occupation with guidance information and with guidance and agricultural information were r = .12 and r = .15, respectively, both of which are significant at the .01 level. However, the difference between the mean scores for agricultural information was significant at the .05 level but when guidance information and agricultural information were combined, the difference between the means was significant at the .01 level by analysis of variance.

Mean scores and differences on five measures for the students classified by plans for post high school education are presented in Table 14. Of the total 390 students involved in the study, 266 are planning to obtain post high school education. The correlation between I.Q. and plans for post high school education was r = .20 and was significant at the .01 level; however, the mean difference in I.Q. scores was 6.56 but not significant. As might be expected, the students planning for post high school had higher intelligence scores.

The mean difference in agriculture interest scores presented in Table 14 is 11.67 and is significant at the .01 level by analysis of variance. The intercorrelation of post high school education and agricultural interest was r = .15 and was significant at the .01 level. Thus, students planning for post high school education were significantly more interested in agriculture.

The students planning for post high school education had higher I.Q. and scored significantly higher on each part of the written test. The correlation of post high school education and guidance information was r = .30 and was significant at the .01 level. The correlation of post high school education and agriculture information was r = .26 and was significant at the .01 level. The difference in mean scores for guidance and agriculture information was 3.74 and was significant at the .01 level by analysis of variance. A correlation of plans for post high school education and guidance and agriculture information resulted in r = .32 which is significant at the .01 level. Better performance would be expected from students with higher I.Q. scores as was the case in the study. Those students planning for post high school education were more intelligent and

Table 14. Mean Scores and Differences on Five Measures for Students Classified by Plans for Post High School Education

Plan for Post High School Education	Number of Students	I.Q.	Agriculture Interest	Guidance Information	Agriculture Information	Guidance and Agricultural Information
Yes	266	103.66	66.83	11.43	10.54	21.93
No	124	97.10	57.16	9.36	8.85	18.19
Difference		6.56	11.67**	2.07**	1.69**	3.74**

**Significant at .01 level by analysis of variance

had significantly more interest in agriculture. As a result, they obtained higher scores on a paper and pencil test that measured guidance and agricultural information. These students probably had used the services of the school counselors. They were more knowledgeable of them and were more willing to learn about guidance information.

Mean scores and differences on five measures for students classified by plans to continue in agriculture are presented in Table 15. A total of 312 of the 390 students in the study were planning to remain in the agricultural curriculum. Although there was a difference of 2.03 in mean I.Q. scores, the difference was not significant. A correlation of agriculture interest and plans to remain in agriculture was r = .33 and is significant at the .01 level. The mean difference in agriculture interest scores was 17.07 and was significant at the .01 level. It stands to reason that students with higher agriculture interest would remain in the agricultural curriculum. The students planning to remain in the agricultural curriculum scored significantly higher to the .01 level on the part of the written test that measures guidance information; however, there were no significant differences between the means for the agriculture information section of the test. The difference for guidance and agriculture information was significant at the .05 level which is about what was expected because the correlation of r = .11 for the total test and plans to remain in agriculture is significant at the .05 level.

The students were classified by place of residence in Table 16. There were 194 farm youth, 121 living in rural areas but not on farms and 75 urban youth. The mean scores for guidance information and agriculture information were 21.85, 19.50, and 19.98 respectively. The means were determined by analysis of variance and through Duncan's Multiple Range Test each mean was found significantly different from the other means at the .01 level. The intercorrelations for place of residence and each part of the test and the total test were: r = .15 for guidance information, r = .14 for agriculture information, and r = .16 for the total test. Each of these correlations was significant at the .01 level. Thus, farm students scored significantly higher on the written test. Those students living on farms also scored significantly higher to the .01 level on the agriculture interest inventory with a mean of 68.09. Rural non-farm students scored 57.80 and the urban students scored 51.23. Each mean was significantly different from the other means at the .01 level by Duncan's Multiple Range Test. The correlation of residence and agriculture interest of r = .33 which was significant to the .01 level indicates that farm youth have more interest in agriculture.

Table 15. Mean Scores and Differences on Five Measures for Students Classified by Plans to Continue in Agriculture

Plan to Continue in Agriculture	Number of Students	I.Q.	Agriculture Interest	Guidance Information	Agriculture Information	Guidance and Agricultural Information
Yes	312	101.97	65.08	11.05	10.04	21.04
No	78	99.94	48.01	9.66	9.87	19.51
Difference		2.03	17.07**	1.39**	.17	1.53*

**Significant at .01 level by analysis of variance
*Significant at .05 level by analysis of variance

Table 16. Student Mean Guidance and Agricultural Information and Agricultural Interest Scores by Place of Residence

Place of Residence	N	Mean Guidance and Agricultural Information Score	Agricultural Interest Score
Farm	194	21.85**	68.09**
Rural Non-Farm	121	19.50	57.80**
Urban	75	19.98	51.23**

**Significantly different at .01 level by analysis of variance

Table 17 presents student mean guidance and agriculture information and agriculture interest scores by amount of farm experience. There were 167 full time, 185 part time and 38 students with no farm experience. A correlation of r = .10 for guidance and agriculture information was significant at the .05 level. The mean scores for the guidance and agriculture information test were 21.52 for full time, 20.12 for part time and 20.46 for urban. Each mean was significantly different at the .01 level by Duncan's Multiple Range Test. The students with full time farm experience scored significantly higher than those with part time or no farm experience.

As expected, students with full-time farm experience scored significantly higher on agricultural interest by analysis of variance. The means were: 68.88 for full-time experience, 58.45 for part-time experience, and 44.92 for no farm experience. By the Duncan multiple range test each mean was significantly different at the .01 level from the other means. The correlation between amount of farm experience and agriculture interest was r = .36 and is significant at the .01 level. Thus, the more farm experience a student had, the higher his agriculture interest score.

Table 17. Student Mean Guidance and Agricultural Information and Agricultural Interest by Amount of Farm Experience

Amount of Farm Experience	N	Mean Guidance and Agricultural Information Score	Agricultural Interest Score
Full time	167	21.52**	68.88**
Part time	185	20.12	58.45**
None	38	20.46	44.92**

**Significantly different at .01 level by analysis of variance

Phase Three

In Phase Three of the project, procedures similar to those used in Phase Two were used. First and second year teachers of agriculture received the unit and the resource materials; they had a two-hour in-service education session with a resource person from the Department of Agricultural Education; they administered the Vocational Agriculture Interest Inventory and the 40 item multiple choice test. Results indicated that first and second year teachers, with this kind of orientation to the unit, could effectively use these teaching materials.

CONCLUSIONS AND RECOMMENDATIONS

Phase One conclusions and recommendations were:

1. Students who were taught the instructional unit by teachers and counselors who received in-service education in their respective schools and by teachers who did not receive any in-service education classes made higher scores on a test of guidance information and agricultural occupations information than those who were not taught the unit. There were no significant differences in methods of utilization of occupational information in agriculture as measured by a test of knowledge of agricultural occupations information alone.

2. The involvement of guidance counselors in teaching a unit on occupational guidance in agriculture had a favorable influence on student achievement.

3. Students who are taught a unit on occupational guidance in agriculture made higher scores than those not taught in formal classes.

4. In-service education in this study did not appear to influence student learning of guidance and agricultural occupations information.

5. Students who were taught by teachers and counselors who received in-service education in their respective schools generally had the most favorable attitude toward ten stimulus concepts as measured by the semantic differential.

6. Student expressed intentions to enter an agricultural occupation, to obtain post high school education, and to elect agriculture were generally associated with treatments, agricultural interest, father's occupation, and I.Q.

7. There is a significant correlation between student attitude toward an agricultural production occupation and toward the agricultural professions and score on the Vocational Agriculture Interest Inventory. There is a significant correlation between student attitude toward their guidance counselor and toward the value of self-analysis and score on the guidance information test.

As a result of this investigation, the following recommendations should be considered:

1. Greater efforts should be made by teachers of agriculture to involve guidance counselors in teaching instructional units on occupational guidance in agriculture.

2. Greater efforts should be made by teacher educators and supervisory personnel to provide teachers and counselors with in-service education in their individual schools.

3. More appropriate forms of guidance and agricultural occupations information should be field tested in controlled teaching experiments and made available to teachers and counselors.

4. A follow-up study of the students involved in this investigation should be attempted in order to obtain information on student career patterns in agriculture.

5. Attempts should be made to insure optimum aspirations of students enrolled in agriculture programs by continuously providing them with appropriate occupational information and adequate counseling by qualified counselors.

Phase Two conclusions and recommendations were:

1. Students planning an agricultural career had higher I.Q. scores and a greater interest in agriculture. They also scored higher on guidance and agricultural information tests.

2. Students planning for post high school education had higher I.Q. scores and a greater agricultural interest. They also scored higher on guidance and agricultural information tests.

3. Students planning to continue in the agricultural curriculum in high school had higher I.Q. scores and agriculture interest scores. They also scored higher on guidance and agricultural information tests.

4. Students living on farms scored highest on guidance and agricultural information tests. They also had the highest agriculture interest scores. Students living in a rural area but not on farms had higher agricultural interest than students living in an urban area.

5. Students with full-time farm experience had the highest agriculture interest scores and students with part-time experience in agriculture had higher interest scores than students with no farm experience. Students with full-time farm experience also had the highest scores on guidance and agricultural information tests.

Phase Three conclusions and recommendations were:

1. First and second year teachers, in a field testing program were able to work effectively with guidance counselors, to use the Vocational Agriculture Interest Inventory, and to teach the unit.

2. Students involved in Phase Three had scores on the 40-item test which were about the same as scores achieved by students involved in Phase One and Phase Two.

APPENDIX A

Test of Knowledge of Guidance and
Agricultural Occupations Information

Examination for the Unit

Preparing for a Career in Agriculture

PART I

On the separate answer sheet, please blacken the best answer to each statement.

1. Your occupational choice should be made:

   a. no later than the 12th grade
   b. in the 9th grade
   c. following a careful study of yourself and occupations
   d. following high school graduation

2. A group of similar jobs in several business establishments is called:

   a. a position
   b. an occupation
   c. a career
   d. a career pattern

3. The occupation you choose will affect:

   a. where you will live
   b. who will be your friends
   c. your standard of living
   d. every aspect of your life

4. Most decisions that you make should be based on:

   a. the probable outcome of alternative courses of action
   b. the judgment of intelligent friends
   c. your first impression of the situation
   d. how they will immediately affect you

5. Self-analysis is a means of better understanding yourself. It should help you see:

   a. yourself as you really are
   b. yourself as others see you
   c. yourself as you think you are
   d. yourself as you think others see you

6. Education increases one's employment opportunities so <u>everyone</u> should complete:

   a. high school
   b. area-technical school training
   c. college
   d. a college graduate school

7. A career choice based <u>entirely</u> on interest is likely to be a:

   a. good choice
   b. poor choice
   c. satisfactory choice
   d. wise choice

8. You can assess your ability best by:

   a. analyzing your test scores
   b. consulting your teachers and guidance counselor
   c. talking to your friends
   d. determining for yourself what you are capable of doing

9. In matching your qualifications with job requirements:

   a. consider your preferences, interests, abilities and personality
   b. secure advice from teachers, counselors, parents and others
   c. consider the work you would like to do years from now
   d. do all of the above

10. In making an individual appraisal, ask yourself:

    a. do I prefer working with things?
    b. do I prefer working with people, ideas, or things?
    c. do I prefer working with people?
    d. do I prefer working with facts, figures, or ideas?

11. Adequate education and training are necessities in the world of work because of:

    a. increasing competition for employment
    b. better paying jobs
    c. the shorter work week
    d. more leisure time

12. Occupational information is concerned with:

    a. the nature of the work
    b. the entrance requirements
    c. current and future employment outlook
    d. all of these

13. Occupational guidance refers to the process of:

    a. exploring a single occupational field
    b. assisting you to explore various fields of work
    c. explaining to you the technical know-how of a job
    d. studying the Dictionary of Occupational Titles

14. The future employment outlook is important when considering an occupation. Employment outlook includes:

    a. the work performed
    b. the working conditions
    c. the tools you work with
    d. none of these

15. One of the best sources of help in career planning other than your school is:

    a. a good friend
    b. the Bureau of Employment Security, State Employment Service
    c. the county Agricultural agent
    d. the State Department of Commerce

16. In studying occupational information, the physical activities you perform and the tools and equipment that you work with are considered a part of:

    a. the employment outlook
    b. the nature of the work
    c. qualifications
    d. entrance and advancement

17. Considering the choice of an occupation an individual needs to:

    a. analyze the job
    b. appraise his own qualifications accurately
    c. strive to match his qualifications against those needed in the job
    d. perform each of the above three steps

18. An occupational brief or a career brief should include the:

    a. description and nature of the work and opportunities available
    b. educational and personal qualifications needed and nature of the work
    c. description of the work, qualifications needed, and opportunities available
    d. entry and advancement opportunities in the occupation and qualifications needed

19. One of the best sources of occupational information that may be found in your school's guidance department or school library is the:

    a. The Job Guide for Young Workers
    b. The Dictionary of Occupational Titles
    c. Career Quarterly
    d. Careers for Young Workers

20. Employers are interested in hiring individuals with the following basic qualifications:

    a. willingness to work and to assume responsibility
    b. dependability, responsibility, resourcefulness, cooperativeness
    c. cooperativeness and dependability
    d. resourcefulness and self-reliance

PART II

21. The number of persons actively engaged in producing food and fiber on farms in the United States is approximately:

    a. 13 to 15 million
    b. 8 to 12 million
    c. 5 to 7 million
    d. 2 to 4 million

22. The term agriculture as used today includes:

    a. agricultural production and marketing
    b. agricultural production and businesses that process and distribute agricultural products
    c. processing and distributing agricultural products, and providing materials and services to farmers
    d. agricultural production and all of the allied businesses and industries

23. Farms in Pennsylvania in the last several years have become:

    a. larger in number and smaller in acreage
    b. fewer in number and larger in acreage
    c. larger in number and smaller in terms of dollars invested
    d. fewer in number and smaller in terms of dollars invested

24. Agricultural occupations usually are classified as:

    a. occupations in agricultural production
    b. non-professional off-farm occupation in agricultural business and industry
    c. the agricultural professions
    d. all of the above

25. Non-professional occupations in agricultural business:

    a. require little training beyond high school
    b. may require some training beyond high school
    c. may require a college degree
    d. require previous work experience

26. Other things being equal, a prospective employee for an agricultural occupation who has an agricultural background normally:

    a. is at a disadvantage
    b. is neither at an advantage nor a disadvantage
    c. has a definite advantage
    d. should not mention it when he seeks the job

27. High School agriculture programs can offer special:

    a. courses in agricultural production
    b. courses in agricultural mechanics
    c. courses in agricultural supplies
    d. courses in any phase of agriculture that will prepare students for employment

28. High school agricultural instruction can assist you in preparing for an agricultural profession by:

    a. helping you secure agricultural employment
    b. helping you develop basic agricultural skills and competencies
    c. helping you make a beginning in farming
    d. helping you find out what you are best suited to do

29. Agricultural professions refer to a group of occupations requiring:

    a. technical training
    b. high school training
    c. college or university training
    d. practical work experience

30. Persons working in agricultural production occupations:

    a. are all considered to be farmers
    b. perform their work primarily on the farm
    c. have little in common with off-farm agricultural workers
    d. are either owners, renters, or managers of farms

31. Occupations in off-farm agriculture are:

    a. few in number and varied in kinds of interest and skills required
    b. large in number and unvaried in kinds of interest and skills required
    c. large in number and varied in the kinds of interest and skills
    d. few in number and unvaried in kinds of interest and skills required

32. Farming and its allied industries:

    a. are independent of each other
    b. are distantly related to each other
    c. are dependent upon each other
    d. compete with each other

33. Off-farm agricultural businesses, industries, and services employ approximately:

    a. twice or three times as many people as are employed in farming
    b. as many people as are employed in farming
    c. two-thirds as many people as are employed in farming
    d. one-half as many people as are employed in farming

34. Which of the following is not an occupational family or a broad instructional area in agriculture:

    a. agricultural mechanics
    b. agricultural supplies
    c. agricultural conservation
    d. agricultural products

35. Employers in off-farm agri-business are interested in employing persons:

    a. with a farm background
    b. who have had experience in working with plants and animals
    c. who have worked in an agricultural business
    d. all of these

36. The most important factor that could cause the entire agricultural industry to grow very rapidly would be:

    a. a gradual increase in America's population
    b. an increased consumption of food and fiber by our present population
    c. a demand to feed an increasing number of persons in foreign countries
    d. an increase in the number of persons working in agricultural occupations

37. Opportunities to enter farming today are:

a. greater
b. fewer
c. about the same as they always have been
d. will increase in years ahead

38. The manager of a livestock feed mill and the farmer who is feeding livestock will need to know:

a. many of the same agricultural knowledge and skills
b. similar agricultural knowledge and skills
c. slightly different agricultural knowledge and skills
d. different agricultural knowledge and skills

39. Persons who work in off-farm agricultural occupations who come in direct contact with farmers in their work:

a. should be able to understand many of the farmer's production problems
b. should be able to understand many of the farmer's production problems and be able to talk to him about them
c. should not be concerned about the farmer's production problem
d. should be able to talk to farmers about their production problems

40. Compared to former years, today's farmers are purchasing materials and services necessary for production at:

a. a higher rate
b. about the same rate
c. a lower rate
d. a much lower rate

APPENDIX B

Phase One Cooperating Schools

School	P. O. Location	County
Pequea Valley	Kinzers 18826	Lancaster
Eastern Lebanon Co.	Myerstown, RD 2, 17067	Lebanon
Garden Spot	New Holland 17557	Lancaster
Tulpehocken	Bernville, RD 2, 19506	Berks
Solanco	Quarryville 17566	Lancaster
Elizabethtown	Elizabethtown 17022	Lancaster
Hamburg	Hamburg 19526	Berks
Red Lion	Red Lion 17356	York
Governor Mifflin	Shillington 19607	Berks
Ephrata	Ephrata 17522	Lancaster
Kennard Dale	Fawn Grove 17321	York
Conrad Weiser	Robesonia, RD 1, 19551	Berks
Manheim Central	Manheim 17545	Lancaster
Spring Grove Area	Spring Grove 17362	York
Cedar Crest	Lebanon 17042	Lebanon
Northern	Dillsburg 17019	York
Kishacoquillas	Reedsville 17084	Mifflin
Selinsgrove	Selinsgrove 17870	Snyder
Huntingdon	Huntingdon 16652	Huntingdon
State College	State College 16801	Centre
Middleburg	Middleburg 17842	Snyder
Bald Eagle	Wingate 16880	Centre
West Snyder	Beaver Springs, RD, 17812	Snyder
Bellefonte	Bellefonte 16823	Centre
East Juniata	Cocolamus 17014	Juniata
Penns Valley	Spring Mills, RD 2, 16875	Centre
Waynesboro	Waynesboro 17268	Franklin
Tri-Valley	Hegins, RD 1, 17938	Schuylkill
Upper Adams	Biglerville 17307	Adams
Middletown	Middletown 17057	Dauphin
Oxford Area	Oxford 19363	Chester
Fairfield	Fairfield 17320	Adams
Eastern	Wrightsville 17368	York
Mifflinburg	Mifflinburg 17844	Union
Lampeter-Strasburg	Lampeter 17537	Lancaster
Pine Grove	Pine Grove 17963	Schuylkill
Lower Dauphin	Hummelstown 17036	Dauphin
Juniata Jt.	Mifflintown 17059	Juniata
Blue Mountain	Schuylkill Haven 17972	Schuylkill
Upper Dauphin	Elizabethville 17023	Dauphin
Chambersburg	Chambersburg 17201	Franklin
Juniata Valley	Alexandria 16611	Huntingdon
James Buchanan	Mercersburg, RD 3, 17236	Franklin
Octorara	Atglen, RD 1, 19310	Chester
Lewisburg	Lewisburg 17837	Union
Gettysburg	Gettysburg 17325	Adams
Mahanoy	Herndon, RD, 17830	Northumberland
New Oxford	New Oxford 17350	Adams

Phase Two Cooperating Schools

School	P. O. Location	County
Northeast	Rome 18837	Bradford
Wyalusing Valley	Wyalusing 18853	Bradford
Liberty	Liberty 16930	Tioga
Mansfield	Mansfield 16933	Tioga
Cowanesque Valley	Westfield 16950	Tioga
Wellsboro	Wellsboro 16901	Tioga
Coudersport	Coudersport 16915	Potter
Oswayo Valley	Shinglehouse 16748	Potter
Northern Potter	Ulysses 16948	Potter
Port Allegany	Port Allegany 16743	McKean
Smethport	Smethport 16749	McKean
Elk Lake	Dimock 18816	Susquehanna
Mountain View	Kingsley 18826	Susquehanna
Montrose	Montrose 18801	Susquehanna
Blue Ridge	New Milford 18834	Susquehanna
Falls-Overfield	Dalton, RD 2, 18414	Wyoming
Lackawanna Trail	Factoryville, RD 1, 18419	Wyoming
Runkhannock	Tunkhannock 18657	Wyoming
Western Wayne Jt.	Lake Ariel 18436	Wayne
Wallenpaupack	Hawley 18428	Wayne
Northwest	Shickshinny 18655	Luzerne
Hazleton Area	West Hazleton 18301	Luzerne
Pleasant Valley	Brodheadsville 18322	Monroe
Bangor	Bangor 18013	Northampton
Bangor J.H.S.	Bangor 18013	Northampton
E. Northampton Vo-Tech	Easton, RD 3, 18042	Northampton
Benton	Benton 17814	Columbia
Central Columbia	Bloomsburg 17815	Columbia
Danville	Danville 17821	Montour
East Lycoming	Hughesville 17737	Lycoming

Phase Three Cooperating Schools

School	P. O. Location	County
Bald Eagle Area	Wingate 16880	Centre
Bellefonte	Bellefonte 16823	Centre
Central Chester Co. AVTS	Coatesville 19320	Chester
Corry Area	Corry 16407	Erie
Crawford Co. AVTS	Meadville 16335	Crawford
Curwensville Area	Curwensville 16833	Clearfield
Fairfield Area	Fairfield 17320	Adams
Forbes	Harrisonville 17228	Fulton
Grove City Area	Grove City 16127	Mercer
Hollidaysburg	Hollidaysburg 16648	Blair
Indiana Area	Indiana, 450 N. Fifth St., 15701	Indiana
Lower Dauphin	Hummelstown 17036	Dauphin
Mohawk	Bessemer 16112	Lawrence
Octorara	Atglen, RD 1, 19310	Chester
Red Land	Etters, RD 1, 17319	Cumberland
Red Lion	Red Lion 17356	York
Reynolds Area	Greenville 16125	Mercer
Rockwood Area	Rockwood 15557	Somerset
South Middleton	Boiling Springs 17007	Cumberland
Union Area	New Castle 16101	Lawrence
United	Armagh, P.O. Box 168, 15920	Indiana

APPENDIX C

Supplementary Materials

Two publications were major products of the project. Copies have been submitted with this report. Additional copies are available from the Department of Agricultural Education, The Pennsylvania State University. They are:

1. Planning for a Career in Agriculture -- Student Resource Unit. Teacher Education Research Series, Volume 8, Number 2, 159 pp., 1967.

2. Planning for a Career in Agriculture -- Teacher's Guide. Teacher Education Research Series, Volume 8, Number 6, 16 pp., 1967.

Schools purchase Student Resource Unit for class use. The Teacher's Guide provides suggested learning activities for five Problem Areas in the unit. It includes selected references relevant to the project.